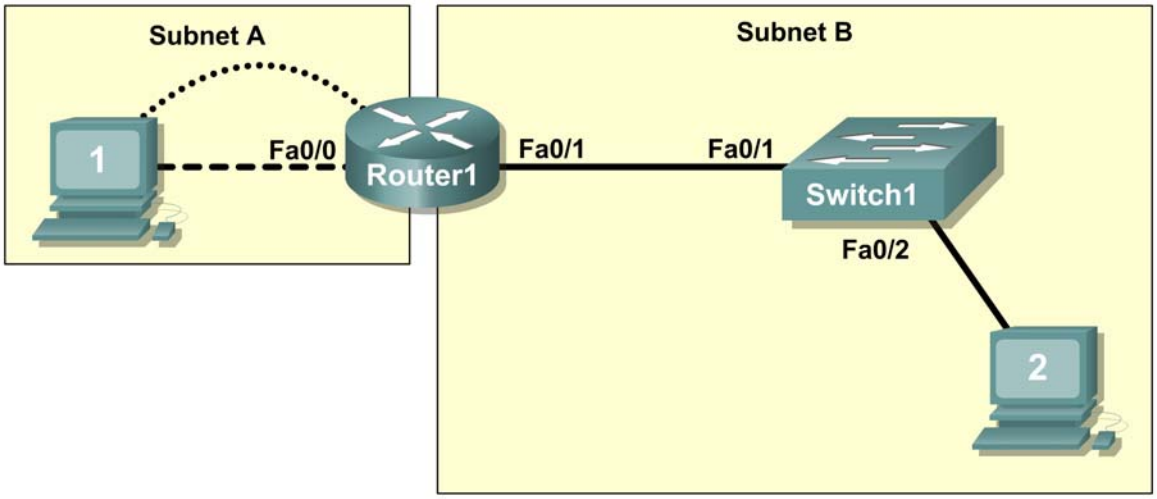
Lab 1.3.3: Troubleshooting a Small Network

Topology Diagram



Learning Objectives

Upon completion of this lab, you will be able to:

- Verify that a paper design meets stated network requirements
- Cable a network according to the topology diagram
- Erase the startup configuration and reload a router to the default state
- Load the routers with supplied scripts
- Discover where communication is not possible
- Gather information about the misconfigured portion of the network along with any other errors
- Analyze information to determine why communication is not possible
- Propose solutions to network errors
- Implement solutions to network errors

Scenario

In this lab, you are given a completed configuration for a small routed network. The configuration contains design and configuration errors that conflict with stated requirements and prevent end-to-end communication. You will examine the given design and identify and correct any design errors. You will then cable the network, configure the hosts, and load configurations onto the router. Finally, you will troubleshoot the connectivity problems to determine where the errors are occurring and correct them

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using the appropriate commands. When all errors have been corrected, each host should be able to communicate with all other configured network elements and with the other host.

Task 1: Examine the Logical LAN Topology

The IP address block of 172.16.30.0 /23 is subnetted to meet the following requirements:

Subnet	Number of Hosts
Subnet A	174
Subnet B	60

Additional requirements and specifications:

- The 0 subnet is used.
- The smallest possible number of subnets that satisfy the requirements for hosts should be used, keeping the largest possible block in reserve for future use.
- Assign the first usable subnet to Subnet A.
- Host computers use the first IP address in the subnet. The network router uses the last network host address.

Based on these requirements, the following topology has been provided to you:

Subnet A	
Specification	**Value**
IP mask (decimal)	255.255.255.0
IP address	172.16.30.0
First IP host address	172.16.30.1
Last IP host address	172.16.30.254

Subnet B	
Specification	**Value**
IP mask (decimal)	255.255.255.128
IP address	172.16.31.0
First IP host address	172.16.31.1
Last IP host address	172.16.31.126

Examine each of the values in the tables above and verify that this topology meets all requirements and specifications. Are any of the given values incorrect? _____

If yes, correct the values in the table above and write the corrected values below:

_____

_____

Create a configuration table similar to the one below using your corrected values:

Device	IP address	Mask	Gateway
Host1	172.16.30.1	255.255.255.0	172.16.30.254
Router1–Fa0/0	172.16.30.254	255.255.255.0	N/A
Host2	172.16.31.1	255.255.255.128	172.16.31.126

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Router1–Fa0/1	172.16.31.126	255.255.255.128	N/A

Task 2: Cable, Erase, and Reload the Routers

Step 1: Cable the network.

Cable a network that is similar to the one in the topology diagram.

Step 2: Clear the configuration on each router.

Clear the configuration on the router using the **erase startup-config** command and then reload the router. Answer **no** if asked to save changes.

Task 3: Configure the Host Computers

Step 1: Configure host computers.

Configure the static IP address, subnet mask, and gateway for each host computer based on the configuration table created in Task 1. After configuring each host computer, display and verify the host network settings with the **ipconfig /all** command.

Task 4: Load the Router with the Supplied Scripts

```
enable
!
config term
!
hostname Router1
!
enable secret class
!
no ip domain-lookup
!
 interface FastEthernet0/0
 description connection to host1
 ip address 172.16.30.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description connection to switch1
 ip address 192.16.31.1 255.255.255.192
 duplex auto
 speed auto
!
!
line con 0
 password cisco
 login
line vty 0
 login
```

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```
line vty 1 4
 password cisco
 login
!
end
```

Task 5: Identify Connectivity Problems

Step 1: Use the ping command to test network connectivity.

Use the following table to test the connectivity of each network device.

From	To	IP Address	Ping Results
Host1	NIC IP address	172.16.30.1	
Host1	Router1, Fa0/0	172.16.30.254	
Host1	Router1, Fa0/1	172.16.31.126	
Host1	Host2	172.16.31.1	
Host2	NIC IP address	172.16.30.1	
Host2	Router1, Fa0/1	172.16.31.126	
Host2	Router1, Fa0/0	172.16.30.254	
Host2	Host1	172.16.30.1	

Task 6: Troubleshoot Network Connections

Step 1: Begin troubleshooting at the host connected to the BRANCH router.

From host PC1, is it possible to ping PC2? _____

From host PC1, is it possible to ping the router fa0/1 interface? _____

From host PC1, is it possible to ping the default gateway? _____

From host PC1, is it possible to ping itself? _____

Where is the most logical place to begin troubleshooting the PC1 connection problems?

_____

_____

Step 2: Examine the router to find possible configuration errors.

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the status of the interfaces?

_____

_____

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If there are problems with the status of the interfaces, record any commands that are necessary to correct the configuration errors.

_____

_____

Step 3: Use the necessary commands to correct the router configuration.

Step 4: View a summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces.

Does the information in the interface status summary indicate any configuration errors on Router1?

_____

If the answer is **yes**, troubleshoot the interface status of the interfaces.

Has connectivity been restored? _____

Step 5: Verify the logical configuration.

Examine the full status of Fa 0/0 and 0/1. Is the IP addresses and subnet mask information in the interface status consistent with the configuration table? _____

If there are differences between the configuration table and the router interface configuration, record any commands that are necessary to correct the router configuration.

_____

_____

Has connectivity been restored? _____

Why is it useful for a host to ping its own address?

_____

_____

Task 7: Clean Up

Unless directed otherwise by your instructor, erase the configurations and reload the switches. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

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